UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

April 30, 1999

MEMORANDUM

SUBJECT: Update on the Proposed Cleanup Action for the Wyckoff Soil and Groundwater Operable Units of the Wyckoff/Eagle Harbor Superfund Site
Bainbridge Island, Washington

FROM: Michael Gearheard
Acting Director, Office of Environmental Cleanup

TO: Bruce Means, Chair
National Remedy Review Board

Region 10 is progressing with our evaluation of thermal technologies for remediation of soil and groundwater at the Wyckoff/Eagle Harbor Superfund Site (Wyckoff) since this site was evaluated by the National Remedy Review Board (NRRB) in July 1998. The purpose of this memorandum is to provide an summary of key results from evaluations performed to date. This memorandum also describes EPA's current plans for proceeding at the site.

Studies that have been performed include a laboratory treatability study of steam injection on Wyckoff soils, biodegradation and oxidation experiments, sheet pile assessment, and modeling of heat flow. Also, we are continuing to interpret results from the use of steam injection at the Visalia, California site.

The key results from the laboratory treatability studies are as follows:

- Total polynuclear aromatic hydrocarbons (PAHs) decreased by 99 percent in soils (5,518 ppm to 48.5 ppm).
- The heavier PAHs that did not increase significantly (e.g., benzo(a)pyrene) are not likely to be mobile and will remain attached to solids.
- As temperature increased, the density of non-aqueous phase liquids (NAPL) decreased (dense NAPL became light NAPL). The decrease in density means that contaminants are less likely to migrate downward through the aquitard.
- As temperatures increased, viscosity decreased significantly enhancing NAPL recovery.
- A significant amount of active heat-resistant microbes rebounded quickly after the soil was cooled, supporting biodegradation of remaining PAH compounds after steam injection.
- Thermal/physical oxidation of PAHs is enhanced by injection of steam and oxygen. Up to 15 percent of NAPL mass is predicted to be destroyed in the ground via oxidation.

Region 10 has worked with EPA's Technology Innovations Office (TIO) to establish a panel of prominent experts to evaluate these results and to make recommendations on how to design and implement thermal remediation at Wyckoff. This panel, known as the Insitu Thermal Technologies Advisory Panel (ITTAP), is also evaluating the potential for thermal remediation at the McCormick and Baxter site in Region 9.

The ITTAP has considered many of the questions and concerns raised at last July's NRRB meeting, for example, whether the shallow overburden would impact the efficiency of contaminant recovery, whether the sheet pile wall and vapor cap would be effective in preventing releases from the treatment zone, and the effectiveness of oxidation and biodegradation in reducing residual contaminant concentrations.

The ITTAP does not believe that any of these concerns will limit the effectiveness of steam injection. The ITTAP supports the use of steam injection for cleaning up soils and groundwater at the Wyckoff site to acceptable levels, i.e., levels that protect the marine environment adjacent to the site. The ITTAP will continue to meet and review additional studies scheduled to be performed. These studies include Wyckoff bench-scale oxidation studies and 2 and 3-D steam modeling studies. The ITTAP has also agreed to develop a conceptual model for remediation at the Wyckoff site and to provide expert support for EPA's design and implementation of steam injection.

As discussed last July, the overall project cost of steam injection is still estimated to be about $50 million. Region 10 believes that steam injection, which dramatically reduces the toxicity, mobility and volume of contaminants at the site, is cost-effective compared to the containment alternative. The containment alternative, which requires a slurry wall and permanent pump and treat system to prevent migration into Eagle Harbor, would not result in significant reductions in toxicity, mobility or volume of contaminants and poses a higher risk of failure in the long-term.

EPA plans to issue a Proposed Plan for the Wyckoff site by the end of June 1999. The Proposed Plan will require that a Pilot Study for steam injection be conducted at the site prior to full-scale remediation. Installation of a sheet pile wall around the site would also be a component of the Proposed Plan, as was previously discussed with the NRRB.

Please let me or Wayne Pierre know if the NRRB would like a briefing or more written information about Region 10's activities or findings at the Wyckoff site.

Bruce, This is a fairly big deal for R-10, and we want to make sure the Board is comfortable with it. Please let us know if you want more info – Mike B.

cc: Wayne Pierre, Region 10 NRRB Representative
Hanh Gold, Remedial Project Manager
Amber Wong, Site Assessment/Cleanup Unit Manager